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Feasibility and efficacy of pairing fecal immunochemical testing with mammography for increasing colorectal cancer screening among uninsured Latinas in northern Manhattan

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ABSTRACT

Objectives. We evaluated the feasibility and efficacy of a program to promote colorectal cancer screening (CRC) among uninsured Latinas receiving mammography through a cancer screening clinic in northern Manhattan.

Methods. Between August 2009 and March 2010, unscreened, average CRC risk, uninsured Latinas, aged 50–64 years, undergoing mammography received a screening recommendation, education, and fecal immunochemical test (FIT). Socio-demographic information and level of acculturation was collected. Screening compliance was assessed.

Results. Of 651 Latinas evaluated, 210 were eligible and, of these, 94% ($n = 197$) consented to participate; 441 were excluded because they were up-to-date with CRC screening ($n = 130$), < 50 ($n = 285$) or > 64 ($n = 26$) years of age. After intervention, 177 (90%) completed FIT. Within 2 weeks, 87% completed the FIT, and 69% did so with no reminder calls. Acculturation was significantly lower among screeners ($p = 0.014$). Compared with non-screeners, screeners were more likely to be foreign-born ($p = 0.009$), to speak only Spanish ($p = 0.043$), and to prefer to read ($p = 0.037$), and think ($p = 0.015$) in Spanish.

Conclusion. This study suggests that pairing CRC education and screening with mammography is both feasible and efficacious.

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Background

Although evidence from randomized trials has demonstrated that screening reduces colorectal cancer (CRC) mortality (Atkin, et al., 2010; Mandel et al., 1993), screening rates for CRC lag behind that of other cancers (American Cancer Society, 2010), particularly for certain populations. Colorectal cancer is the second most commonly diagnosed cancer and the second and third leading cause of cancer death among Hispanic men and women in the United States. Compared with non-Hispanic whites and African Americans, Hispanics are more likely to be diagnosed at a later stage of disease, and have a lower probability of 5-year survival (American Cancer Society, 2009a). This disparate cancer burden may be due, to a certain extent, to their comparatively low participation in screening (American Cancer Society, 2009b).

Increasing CRC screening within the Hispanic population is a public health priority because of the absolute and predicted size of

this demographic subgroup. In the past decade the Hispanic population in the U.S. grew by 43% to 50.5 million (Humes et al., 2011) and is expected to triple by 2050 (Passel and Cohn, 2008). As the Hispanic population grows and ages, cancer incidence is projected to increase 142% between 2010 and 2030 (Smith, et al., 2009).

Understanding and addressing factors contributing to disparities in CRC screening is challenging. This is due, in part, to socio-cultural factors, including English proficiency, level of acculturation, and heterogeneity within the Hispanic subpopulations (American Cancer Society, 2010; Dressler, 1993; Goodman, et al., 2006; Lobell, et al., 1998; Shah et al., 2006). Several studies have found that inability to communicate in English, a component of many measures of acculturation (Lara, et al., 2005; Zane and Mak, 2003), was associated with lower cancer screening rates (Beach, et al., 2007; Diaz, et al., 2008; Marks, et al., 1987; Solis, et al., 1990; Woloshin, et al., 1997).

Women who undergo mammography may be more likely to screen for CRC (Lemon et al., 2001; Shapiro, et al., 2001; Sheinfeld Gorin and Heck, 2005). Compared with men, women are more likely to screen for CRC using fecal-based tests than with endoscopic procedures (Mensees et al., 2010; Weinberg et al., 2009). Based on these data, we evaluated the feasibility and efficacy of a program to promote CRC

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screening among uninsured Latinas receiving mammography. We also assessed the relationship between socio-demographic and acculturation characteristics and completion of CRC screening. No studies of this nature have been reported in the published literature.

Methods

The Northern Manhattan Cancer Screening Partnership is part of a New York State cancer screening program funded by the New York State Department of Health and the Centers for Disease Control and Prevention. The Partnership provides breast, cervical, and CRC screening at no cost to uninsured residents of the Washington Heights-Inwood and Central Harlem neighborhoods of New York City. Women were recruited into the Partnership through community outreach. Inclusion criteria were: female, no health insurance, family income $\leq 250\%$ of the federal poverty level, Hispanic race/ethnicity, aged 50–64 years, asymptomatic for CRC, and at average risk for CRC, defined as no personal or family history of adenomatous polyps or CRC, no history of inflammatory bowel disease, and no genetic CRC syndromes. Exclusions included: males, having medical insurance, self-reported race/ethnicity other than Hispanic, under 50 or over 64 years of age, self-reported changes in bowel habits or presence of blood in the stool, or up-to-date with recommended CRC screening (colonoscopy within the past 10 years, flexible sigmoidoscopy within the past 5 years or fecal-based testing for occult blood within the past 12 months).

CRC recommendation, education and FIT distribution

Each participant received a CRC screening recommendation from the Partnership health care provider, in-person CRC education, a specimen collection demonstration, and a free FIT kit. All education and data collection procedures were presented at the 6th grade literacy level based on Flesch-Kincaid method (Kincaid et al., 1975), translated into Spanish and back-translated into English, pilot tested then delivered in Spanish by bilingual lay health educators. No financial incentives or monetary compensation was provided.

The one-on-one education, approximately 10–12 minutes in duration, was conducted following completion of the mammogram and consisted of two sections. The first educated participants about CRC and the second educated them about CRC screening. The lay health educator used a script with companion 8" \times 5" cards containing graphics and text written in English and Spanish to which she referred. The lay health educator also performed a physical demonstration of the fecal specimen collection procedure using PlayDoh® as simulated feces. Questions and answers followed the education and demonstration.

Participants were provided with written instructions in both Spanish and English developed by the authors that were visually attractive and included graphics to provide a visual reminder to be used at home during specimen collection, and an FIT kit containing a test card, two specimen collection brushes, two disposal bags, specimen labels, and a pre-filled test request form. Participants were instructed to complete the test at home and return it immediately following the collection of the second specimen and within 2 weeks. The completed kits could be hand-delivered to the Partnership or mailed directly to the laboratory in a self-addressed, stamped envelope provided.

If the completed kit was not returned within 2 weeks, a reminder call was placed to encourage the participant to return the kit and to uncover and address barriers to screening completion. Questions were answered, support offered, and, if necessary, a second kit was mailed to the participant. Follow-up calls were placed weekly thereafter for 8 weeks or until either the kit was returned or the participant verbally refused to complete the test.

Measures

Upon enrollment, socio-demographic characteristics, including age, race, country of origin, monthly household income, family size, educational attainment, and employment and marital status were collected. The outcome measure, return of a completed FIT, was determined by a review of Partnership patient records. The number of telephone reminder calls made and number of days from kit distribution to test completion were also documented.

Acculturation was measured in several ways. Language and media use components of the short acculturation scale developed by Marin et al. (1987) were used along with measures of nativity and length of residence. The latter have been found to approximate acculturation (Abraido-Lanza et al., 2005; Himmelgreen, et al., 2004; Singh and Siahpush, 2002) and demonstrate correlation with language-based and multidimensional measures of acculturation (Marin and Marin, 1991). Language use was measured using a 7-item scale. "Languages spoken" was created from responses to two questions: "How many languages do you speak?" and "Which language(s) do you speak" and was coded as 0 = Spanish only and 1 = Spanish and one or more other languages. Responses to "Which language did you speak as a child?" and questions about language preference for reading, speaking at home, speaking with friends, thinking, watching television programs, and listening to the radio were coded as 0 = Spanish, 1 = other than Spanish. Nativity was coded as 0 = foreign born and 1 = U.S. born. Length of residence was dichotomized and coded as 0 = ≤ 10 years and 1 = > 10 years based on the report by the American Cancer Society that 10 years residence or less in the United States is associated with greater likelihood of no CRC screening among Hispanics (American Cancer Society, 2010). A total acculturation score was calculated by summing responses to the ten questions. Internal consistency reliability of the acculturation measure was Cronbach's alpha = 0.84.

Statistical analysis

Descriptive statistics were calculated for all variables, including the frequency with which the FIT kits were returned. To assess associations between the socio-demographic variables and returning the FIT, Chi-square analysis or Fisher's exact test was used for categorical variables. Acculturation scale measures were summed and mean, range, and standard deviation were calculated. Student's *t*-test was used to assess if there were differences in mean acculturation scores and length of residence in the U.S. between women who did versus women who did not return the FIT kit. All statistical tests were two-sided using a *p* value < 0.05 . Data analysis was performed using SPSS, version 17.0.

The Institutional Review Boards of Columbia University Medical Center, Teachers College, and the New York State Department of Health granted approval for all study procedures.

Results

During the 8-month period, 651 uninsured Hispanic women accessed services through the Partnership. Of these, 441 were excluded from the study: 130 (29%) were up to date with CRC screening; 285 (65%) were < 50 ; and 26 (6%) were > 64 years of age. After exclusion, 210 were eligible, of whom, 94% ($n = 197$) consented to participate.

Socio-demographic characteristics

Socio-demographic characteristics are displayed in Table 1. The mean age was ~ 55 years (*SD* 3.8) and the reported mean monthly family income was \$698 (*SD* \$487). Mean family size was 2.8 persons (*SD* 1.5). The majority of participants self-reported white, Hispanic as their race (82.2%) and 61.4% were born in the Dominican Republic.

Table 1
Socio-demographic characteristics of CRC screening-eligible uninsured Latinas undergoing mammography at the Northern Manhattan Cancer Screening Partnership August 2009 through March 2010.

	Total	
	n = 197	
	Mean	SD
Mean age	54.8	3.8
Mean monthly family income	698.0	487.4
Mean family size	2.8	1.5
	n	%
Race ^a		
White, Hispanic	162	82.2
Black, Hispanic	32	16.2
Hispanic, unknown race	2	1.0
Hispanic, other race	1	0.5
Country of origin ^a		
Dominican Republic	121	61.4
Other	76	38.6
Educational attainment ^b		
Less than 8th grade	32	17.1
8th to 11th grade	38	20.3
High school graduate or equivalent	45	24.1
Vocational or trade school	14	7.5
Some college	51	27.3
College graduate	1	0.5
Post graduate	6	3.2
Employment status ^c		
Employed full time	54	28.7
Employed part time	56	29.8
Homemaker	17	9.0
Retired	2	1.1
On disability	2	1.1
Student	1	0.5
Unemployed	52	27.6
Other	4	2.1
Marital status ^b		
Married	57	30.5
Living as married	9	4.8
Widowed	11	5.9
Separated	30	16.0
Divorced	38	20.3
Single, never married or never lived as married	42	22.5

^an = 197. ^bn = 187. ^cn = 188.

More than one-third had less than a high school education, 27.6% were unemployed, and ~35% were married or living as married. There were no significant differences between those who did versus those who did not return the FIT on any socio-demographic factor.

Compliance with CRC screening with FIT was 90% (n = 177) (Table 2). Of those who returned the FIT, 87% (n = 154) did so within the first 2 weeks of receiving CRC education. More than two-thirds completed the test without any telephone reminders and an additional 19.3% (n = 38) returned the kit after a single reminder call.

Table 2
CRC screening behaviors with FIT among uninsured Latinas undergoing mammography at the Northern Manhattan Cancer Screening Partnership August 2009 through March 2010.

Variable	n	%
Completed CRC screening ^a	177	90.0
Time to return completed kit ^b		
Less than 7 days	43	24.3
1–2 weeks	111	62.7
3–4 weeks	12	6.1
>4 weeks	11	6.9
No. of reminder calls ^a		
None	136	69.0
1	38	19.3
2–3	10	5.1
>4	13	6.6

^an = 197. ^bn = 177.

Table 3
Individual measures in acculturation scale by CRC screening status among uninsured Latinas undergoing mammography at the Northern Manhattan Cancer Screening Partnership, August 2009 through March 2010.

Variable	Total			Screeners		Non-screeners		P
	n	%	% Screened	n	%	n	%	
Nativity, foreign born	191	97.0	91.1	174	98.3	17	85.0	0.009
Spoken language								
Spanish only	140	74.5	93.6	131	76.6	9	52.9	0.043
Spanish spoken as a child	182	96.8	91.8	167	97.7	15	88.2	0.093
Spanish as preferred language								
Read	179	95.2	92.2	165	96.5	14	82.4	0.037
Speak at home	177	94.1	91.5	162	94.7	15	88.2	0.261
Speak with friends	174	92.6	92.5	161	94.2	13	76.5	0.026
Think	176	93.6	92.6	163	95.3	13	76.5	0.015
Watch television	157	83.5	92.4	145	84.8	12	70.6	0.165
Listen to the radio	165	88.2	92.1	152	89.4	13	81.3	0.398

Acculturation

An overwhelming majority of women were foreign-born (n = 191) (Table 3). Approximately 75% (n = 140) reported speaking only Spanish, 96.8% spoke Spanish as a child, 95.2% preferred to read in Spanish, 94.1% speak Spanish at home, 92.6% speak Spanish with their friends, and 93.6% think in Spanish. Most preferred Spanish media (83.5% for Spanish television and 88.2% for Spanish radio). Compared with non-screeners, screeners were more likely to have been foreign-born (p = 0.009), spoke only Spanish (p = 0.043), and preferred Spanish for reading (p = 0.037), speaking with friends (p = 0.026), thinking (p = 0.015). The mean value for overall acculturation score was 1.4 (SD 1.9) on a scale of 0–10. The acculturation score was significantly lower among women who returned the FIT kit (M = 1.3, SD 1.8) than among those who did not (M = 2.6, SD 3.1) ($\chi^2 = -2.472$, p = 0.014). Mean length of U.S. residence was 17.3 years (SD = 11.7) and did not vary by screening status.

Discussion

The screening rate in our study was considerably higher than in other intervention studies (Braun et al., 2005; Coronado et al., 2011; Costanza et al., 2007; Maxwell et al., 2010; Myers et al., 2007; Potter et al., 2009; Sequist et al., 2009; Stokamer et al., 2005; Walsh et al., 2010), suggesting that pairing CRC education and screening with mammography may be a feasible and efficacious strategy for increasing CRC screening among some subgroups of women. Prior observational studies have shown an association between mammography and CRC screening (Lemon et al., 2001; Shapiro et al., 2001; Sheinfeld Gorin and Heck, 2005). For example, in a telephone survey of Massachusetts residents age 50 years and older Lemon et al. (2001) found an association between having a mammogram in the preceding 2 years and CRC screening (OR = 4.40; 95% CI = 2.94, 6.58). This finding was consistent with two other cross-sectional analyses using national probability samples from the Behavioral Risk Factor Surveillance System (Shapiro et al., 2001) and the National Health Interview Survey (Sheinfeld Gorin and Heck, 2005). All three demonstrate that women who undergo mammography are more likely to screen for CRC. We identified one published study that evaluated offering colonoscopy at the time of mammography among women attending a breast cancer facility in Harlem. Only 23% of those undergoing a mammogram who were eligible for CRC screening agreed to participate and, of those, 55% completed the colonoscopy (Shike, et al., 2011). The high rate of screening observed in our study may also be due, in part, to the use of FIT to screen for CRC. Relative to gFOBT, FIT increases CRC screening compliance, which has been attributed to reducing dietary restrictions and addressing barriers related to fecal manipulation (Cole, et al., 2003; Cole and Young, 2001; Pignone, et al., 2001; Smith, et al., 2006).

Our finding that less acculturated Latinas are more likely to screen for CRC differs from others' findings (Afable-Munsuz et al., 2009; Jerant et al., 2008; Shah et al., 2006). While this disparate finding may be due to variations in the measurements of acculturation, specific subpopulations studied, and the type of CRC screening recommended, factors associated with the program may provide insight to interpreting this result. First, our program provided cancer screening to low-income Latinas who lacked medical insurance and, thus removed the access to care barrier. Second, the use of bilingual lay health educators mirrors the role of patient navigators described by others (Freeman, 1989; Jandorf, et al., 2005; Percac-Lima, et al., 2009), which are thought to succeed largely due to the linguistic and cultural concordance between the navigator and the patient population. Thus, once financial and social-cultural barriers are removed, individuals with lower levels of acculturation appear to be quite likely to participate in screening.

The main limitation is that we focused on a specific underserved population, namely low-income, uninsured Latinas who had access to, were eligible, and chose to screen for breast cancer through this Partnership. Hence, our intervention may not be equally effective when implemented in other populations and settings. Nevertheless, the sample characteristics are consistent with a population that, compared to non-Hispanic whites, is less likely to screen for CRC and more likely to be diagnosed at a later stage of disease, with a worse prognosis. Additionally, the measure of acculturation employed in this study conceptually implies a linear adaptation to the dominant culture (progression from non-acculturated through acculturated) and does not account for multidimensional factors known to influence social change among immigrant populations (Clark and Hofsess, 1998; Zane and Mak, 2003). Lastly, the Partnership required that all participants receive the same services, which precluded comparing a group receiving the full CRC intervention to one receiving an alternative intervention, (e.g., only given a FIT kit and recommendation without education and counseling).

Conclusions

This study supports the feasibility and efficacy of an intervention approach that pairs mammography and CRC screening in a community-based setting. Latinas who accessed this program to obtain mammography were very likely to also undergo CRC screening using FIT, with minimal additional programmatic support. Directing resources and energy to education and one-on-one communication that is linguistically concordant with the community, as well as providing FIT kits and demonstrating the specimen collection procedure at the time of mammography, could potentially reduce the need for intensive CRC screening follow-up and patient navigation. Further research to improve understanding about the specific educational, inter-personal, linguistic, and cultural factors associated with CRC screening among Latinas undergoing mammography is warranted along with testing this approach in other populations and settings.

Conflict of interest statement

The authors declare there is no conflict of interest.

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